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ABSTRACT

This review of computerized career information and guidance systems begins with a discussion of the increase in computer systems in daily life. Part 2 examines the emergence of a national career information system program. The development of computerized systems that assist in career decision making is described in part 3. Part 4 provides descriptive information on leading computerized systems, comparing such elements as effectiveness, user populations, marketing services, and others. Part 5 reviews the literature on system research and evaluation for the following populations: junior/senior high school students, postsecondary students, and non-school adults. The review also contains charts illustrating the various elements of the different systems. Appended materials include proposed standards and self-evaluation guides for system assessment and a list of systems publications. (CT)

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COMPUTERIZED CAREER INFORMATION
AND GUIDANCE SYSTEMS

written by

John S. Clyde
Chemeketa Community College
Salem, Oregon

The ERIC Clearinghouse on Adult, Career, and Vocational Education
The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

1979

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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FOREWORD

The Educational Resources Information Center on Adult, Career, and Vocational Education (ERIC/CE) is one of sixteen clearinghouses in a nationwide information system that is funded by the National Institute of Education. One of the functions of the Clearinghouse is to interpret the literature that is entered in the ERIC data base. This paper should be of particular interest to local and state education department personnel, educational researchers, and program planners who are involved in career and occupational information systems.

The profession is indebted to John Clyde for his scholarship in the preparation of this paper. Recognition also is due Martin Katz, Educational Testing Service; William Hilton, Illinois State Scholarship Commission; and Robert Campbell, The National Center for Research in Vocational Education, for their critical review of the manuscript prior to its final revision and publication. Robert D. Bhaerman, Assistant Director for Career Education at the ERIC Clearinghouse on Adult, Career, and Vocational Education, coordinated the publication's development. Cathy Thompson assisted in the editing of the manuscript and Bonna Somerlott typed the final draft.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

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ABSTRACT

This review of computerized career information and guidance systems begins with a discussion of the increase in computer systems in daily life. Part 2 examines the emergence of a national career information system program. The development of computerized systems that assist in career decision making is described in part 3. In part 4, descriptive information on leading computerized systems, such elements as effectiveness, user populations, marketing services, and others are compared for the different systems. Part 5 reviews the literature on system research and evaluation for the following populations: junior/senior high school students, postsecondary students, and non-school adults. The review also contains charts illustrating the various elements of the different systems. Appended materials include proposed standards and self-evaluation guides for system assessment and a list of systems publications. (CT)

DESC::Adults; Career Development; *Career Planning; Career Opportunities; *Computers; *Decision Making; *Guidance Counseling; *Information Systems; Junior High School Students; Postsecondary Education; Program Development; Senior High Schools; *Systems Analysis

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INTRODUCTION

"Are you saying that a computer can now help me choose a career?"

"Yes, indeed. Why don't you just sit down in front of this computer terminal and type in your name and then touch the return key."

No longer is this an atypical conversation heard in high schools, colleges, and social agency offices across the country. In literally thousands of such settings, counselors have carefully weighed the benefits of utilizing the computer as a tool to improve the career guidance and information services for their students and clients. School boards, college administrators, and agency chiefs have investigated benefits from somewhat different perspectives -- cost effectiveness, staffing patterns, institutional priorities, as well as from a public relations point of view -- and have selected the computer to assist in one of the most important of life's decisions, namely, choosing a career.

Today a number of sophisticated computerized guidance and information systems are available that have demonstrated their utility in helping people in the career decision making process and in improving access to career information. No longer can this array of systems be considered experimental or even innovative, although some have a much longer record of service than others. This paper will attempt to review the literature related to these highly developed computer applications, differentiate between the major systems, and discuss some of the factors that may enhance their future.

An analogy can be drawn between this emerging computer application of the 1970s and the pneumatic tire industry of the 1920s (World Book, 1974). There was little doubt by the 1920s that automobiles were here to stay and that developmental efforts in the tire

industry had reached a point where pneumatic tires were being considered safe under almost all driving conditions. Several tire companies emerged from the pack as leaders both in manufacturing a quality product and producing quantities that could be cost effective. Through competition, consumers were made aware that there were in fact differences between these leading brands. By and large, tires were becoming just tires, with considerable utility to people driving automobiles. Industry standards were being considered by governmental agencies; however, the major tire companies and an informed group of consumers were having the most effect on quality control. Interestingly, Congress did not pass the first Federal Tire-Safety Law until 1966. These laws established standards for quality, size, and strength of the tires.

Today, the computer also has become a part of our daily life. Its capability to move vast amounts of information quickly and accurately is an important factor in shaping our society. Computerized systems of career guidance and information have emerged as one of a number of practical applications of the computer. From an estimated thirty systems that have been developed over the past twelve to fifteen years, there exist today little more than a half dozen that can be considered leaders. They all have their unique features; however, by and large, these systems are becoming much like the pneumatic tires in the late 1920s. Standards are being studied by the federal government; however, some system developers and statewide system directors also are addressing the qualitative aspects of the systems.

Unfortunately, unlike the early pneumatic tire industry where the number of tires being produced afforded leaders a profitable margin, sufficient quantities of these computerized systems have not been put into place to ensure long-term financial stability. Financial help will be needed from the federal government and possibly from other sources for several more years until installations are sizable in most if not all 50 states. As one system developer stated on his returned questionnaire, "Temporary federal subsidies to systems that have demonstrated their effectiveness and value would enable them to survive until a critical mass of users has been established."

THE EMERGENCE OF A NATIONAL CAREER INFORMATION SYSTEM PROGRAM

At the national level, awareness of the need for improved career guidance and occupational information systems has been growing in recent years. The economic dislocations and labor market imbalances of the 1970s particularly have pointed out the need for improved career planning by individuals, as well as by education and training institutions.

The Educational Amendments of 1968 emphasized vocational guidance and provided funding to schools for fully functioning career guidance programs, including career information services, testing, and test interpretation.

The emphasis, beginning in the early 1970s, on career education and guidance in elementary and secondary schools set into motion four distinct models for developing career education: school-based, employer-based, community-based, and home- and family-based programs. These early models had -- and are continuing to have -- substantial influence on contemporary educational thinking in the area of experiential learning. The Career Educational Demonstration Act in 1974 established the Office of Career Education and has distributed nearly 50 million dollars to promising career education activities. The Career Education Incentives Act of 1977 will pump over 20 million dollars each year into career education demonstration projects. A portion of this financial support for career education has and will continue to flow directly and indirectly into effective delivery systems of career guidance and information.

The passage in 1973 of the Comprehensive Employment & Training Act (CETA) provided for more local control of manpower training programs and funding for public service employment and training. These units of local and state government, called CETA prime sponsors, contracted extensively with local schools and agencies for improved career services models and, most recently, have provided more direct counseling and information services for clients.

In 1975, the Employment and Training Administration (ETA), U.S. Department of Labor, established a grants program to fund eight states to set up career information systems. This created a major focus on providing better access to occupational information and computerized delivery systems, especially those that could be

reasonably adapted to serving an entire state. Emphasis also was placed on cooperative efforts between state manpower, educational, and other agencies for the provision of local occupational information for career decision-makers. The Oregon Career Information System was used as a state-wide organizational model for this program administered by DOL's Division of Career Information Services (DCIS). Oregon was set up as a public consortium with an advisory board and staff with expertise in the development of occupational and educational information, user services, data processing, and management. Four states selected Oregon's delivery system: Colorado, Massachusetts, Minnesota, and Washington. Three states (Wisconsin, Ohio, and Alabama) chose to adapt the Guidance Information System (GIS) to meet their needs. Michigan designed its own system and developed computer software. Most of the state CISSs have recently joined others to form the Association of Computer-Based Systems for Career Information (ACSCI), a non-profit corporation to enhance state-wide information systems through the sharing of ideas, resources, and the establishing of quality control. (See Appendix A, Proposed Standards and Self-Evaluation Guides for System Assessment.)

A provision of the Educational Amendments of 1976 established the Educational Information Centers Program (EIC) in order to provide educational information, guidance, counseling, and referral services to all individuals in a state through centers located within a reasonable distance of all residents in a state, including those individuals residing in rural areas. In meeting this mandate, many states are studying all operational delivery systems of educational information, with particular focus on computerized systems.

The passage of the Educational Amendments of 1976 also established the National Occupational Information Coordinating Committee (NOICC) for bringing together educational programs with those administered in manpower. This action set into motion a national/state system for coordinating development and delivery of occupational information. The process involved an interagency agreement between ETA, the Bureau of Labor Statistics, the U.S. Office of Education, and the National Center for Educational Statistics. The responsibilities of the NOICC and of the state committees (SOICCs) involved improving the quality and utilization of data to be used for vocational education and CETA program planning and implementing an Occupational Information System (OIS).

Figure 1

OIS INFORMATION BASE AND THE TWO MAJOR USES OF OCCUPATIONAL INFORMATION

OCCUPATIONAL INFORMATION BASE

- I. OCCUPATIONAL DEMAND INFORMATION
 - 1.1 CURRENT OCCUPATIONAL EMPLOYMENT
 - 1.2 JOB VACANCIES
 - 1.3 EXPANSION OR REDUCTION IN OCCUPATIONAL DEMAND
 - 1.4 REPLACEMENT DEMAND
 - 1.5 EMPLOYMENT BY INDUSTRY
- II. OCCUPATIONAL SUPPLY INFORMATION
 - 11.1 ENROLLMENTS IN AND COMPLETERS AND LEAVERS FROM TRAINING/EDUCATIONAL INSTITUTIONS
 - 11.2 CURRENTLY UNEMPLOYED
 - 11.3 LABOR MARKET NET MIGRATION
 - 11.4 OCCUPATIONAL TRANSFERS
 - 11.5 NEW ENTRANTS OR RE-ENTRANTS TO THE LABOR FORCE
- III. OCCUPATIONAL CHARACTERISTICS INFORMATION
 - 111.1 EARNINGS AND BENEFITS
 - 111.2 JOB DUTIES
 - 111.3 WORK SETTINGS AND CONDITIONS
 - 111.4 ABILITY AND APTITUDE
 - 111.5 LICENSING, REGISTRATION, AND CERTIFICATION REQUIREMENTS
 - 111.6 EDUCATION/TRAINING SKILL ACQUISITION PATTERNS
 - 111.7 EDUCATION/TRAINING REQUIREMENTS
 - 111.8 DEMOGRAPHICS OF WORKERS BY OCCUPATION
 - 111.9 CAREER LADDERS
 - 111.10 MAJOR EMPLOYERS
 - 111.11 HIRING CHANNELS
- IV. COMPLEMENTARY INFORMATION
 - IV.1 INVENTORY AND DESCRIPTIONS OF EDUCATION AND TRAINING PROGRAMS
 - IV.2 FINANCIAL ASSISTANCE PROGRAMS
 - IV.3 LABOR FORCE DEMOGRAPHICS AND TRENDS
 - IV.4 ADDITIONAL SOURCES OF OCCUPATIONAL INFORMATION
- V. AUXILIARY INFORMATION NECESSARY TO SUPPORT OCCUPATIONAL DEMAND/SUPPLY ANALYSIS (E.G., CROSS-CODE RELATIONSHIPS)

TO SUPPORT THE PLANNING
PROCESS FOR VOCATIONAL
OR OCCUPATIONAL EDUCA-
TION PROGRAMS AND MAN-
POWER TRAINING PROGRAMS



USERS

PLANNERS AND
ADMINISTRATORS

TO SUPPORT THE CAREER
PLANNING, GUIDANCE, AND
JOB SEARCH NEEDS OF
VARIOUS TARGET
POPULATIONS



USERS

DIRECT PARTICIPANTS IN
THE LABOR MARKET

LABOR MARKET INTER-
MEDIARIES

Figure 1 represents a conceptualization of a state's Occupational Information System. Much of the occupational data base (the center section of the chart) presently exists in a number of the states. Ironically, even though the need is great, this occupational information has not flowed regularly to program planners (left side of chart) nor to those persons making career decisions (right side of chart), including computerized career information and guidance systems.

While not oversimplifying the problem, coordination of the data producing agencies and the delivery modes *is* long overdue. Many of the SOICCs are presently studying the feasibility of a career information system for improving career decision-making in their state. Other states that have established delivery systems are concentrating on improved labor market supply and demand data for both career decision-makers and program planners.

The passage of the Youth Employment and Demonstration Projects Act of 1977 amended CETA and broadened the mandate of the NOICC to give special attention to the labor market information needs of youth, including encouraging the expansion of employment counseling services and assisting the development of computerized guidance systems. It also gave special attention to providing technical assistance for programs of computer on-line terminals and other facilities to utilize and implement occupational career outlook information. The purpose of this is to improve the match of the youth career desires with available anticipated labor market demand. This clearly cast the NIOCC and the SOICCS into the computerized career information and guidance system arena.

At the time of writing, the NIOCC was moving to initiate a competitive grants program supporting additional development of state-wide career information systems. Nearly two million dollars will be distributed during FY 80 and FY 81 each to selected SOICCs for establishing a state-wide CIS. Developmental steps in establishing a CIS include: (1) establishing a functional organizational structure, (2) selecting a computerized information delivery system(s) and alternative delivery media, (3) establishing cooperative arrangements with state data producers, and (4) setting up a staff that includes individuals with competence in areas of occupational analysis, counseling, data processing, and management. (See Appendix A, ACSCI's Proposed Standards.)

Additionally, the NIOCC and the SOICCs will increasingly deal with many of the substantial issues related to the field of computerized career guidance and information systems. These issues include: (1) standardizing occupational classifications and topical categories for exchange of data bases between states and among systems, (2) increasing the quality of data that is presently in developed systems, (3) assessing delivery costs, (4) providing adequate technical assistance, including training materials to states establishing CISOs, and (5) relating the CISO to the other components of the state OIS that they are charged to implement.

Essentially the strongest justification for the NOICC being involved beyond what is specifically in federal legislation is the need for an overall coordinated federal role in this area. Given the fact that a range of federally funded programs supporting education and training have provisions of funding support for career information delivery and guidance efforts, an overall federal initiative in the area should encourage and facilitate a state-wide strategy, allowing for coordinated use of funds from various sources in both the DHEW and DOL.

THE DEVELOPMENT OF COMPUTERIZED SYSTEMS THAT ASSIST IN CAREER DECISION MAKING

The development and use of computerized career information and guidance systems began more than a decade ago with pioneering efforts in a dozen locations. The force behind this movement was the recognition of an urgent need for an accurate and comprehensive system of information transmission to support effective career guidance practice. The selection of a computer based system with which to store, organize, update, and retrieve large quantities of information for immediate and easy access seemed to be a logical development (Harris, 1972). Walz has indicated that an emerging guidance technology provides opportunities to realize in new ways the old goals we strive for and to accomplish goals we previously thought unattainable (Walz, 1970). The development and use of computerized systems has remained in a constant state of revision and change in an attempt to accomplish the goal of an accurate and comprehensive support system.

This paper will not attempt to cover in any detail the early conceptual work that went into developing systems for vocational guidance. Historical perspective and descriptions of systems are covered adequately in other texts (HEW, 1969; Super, 1970).

It may be helpful, however, to define career guidance. The program can be viewed as a systematic set of experiences which assist job seekers in understanding the relatedness of their own preferences or abilities to work, to gain knowledge of realistic occupational options, and to make satisfying and reasonable decisions concerning these career options. Any career guidance or information system which uses automation to deliver some part or parts of this set of experiences to the student or client can properly be called a computerized system. A little more explanation is in order.

All systems, including some no longer in use, can be divided into three general categories or types: computer-assisted or batch-process systems, on-line career information systems, and on-line career guidance systems (Morgan, 1978).

The batch-process systems normally consisted of a large central processing unit (the computer) in one location that stored data files of occupational characteristics, colleges, test responses and other guidance information. The user of the system would complete a questionnaire or form on which one indicated the characteristics desired in an occupation or a college. Some systems use a person's ability and interest test scores. These forms or test results are sent to the computer site where the user-provided information is "fed" into the computer through data cards or an optical scanning device. The user later receives a printout from the computer which states the occupation or occupational patterns that match one's characteristics, relevant colleges, or other such information. Although the student or client is not in direct communication with the computer, and feedback is delayed sometimes up to two or three weeks, this type of system assists individuals in the decision-making process by using a computer to search large data files and identify options with predetermined characteristics.

With the advent of computer terminals and their communication with the computer by phone lines or cables, "on-line" career information systems emerged. In these systems, large data files were stored in the computer with the user given instant access to them through terminals. Interactive conversation or dialogue was developed in order to provide communication between the computer and its stored files and the user.

With on-line career information systems, users were not only provided the capability of fast retrieval of large data files, but they also could make sophisticated file searches, allowing them to control the addition and deletion of personal and occupational characteristics. Users were provided the opportunity to explore options broadly, recycle through search strategies using different characteristics, and receive different options based on different characteristics. An important attribute of this type of system is that the user is in direct communication with the computer and has a high level of control over its functions.

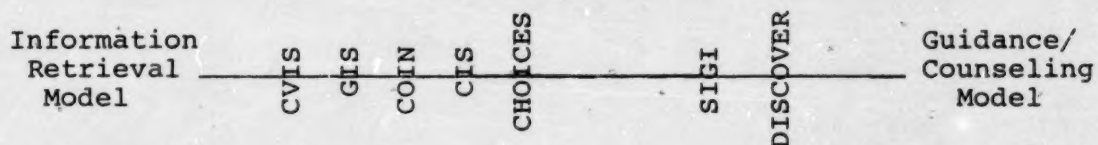
The third category or type of system, on-line career guidance, harnesses the computer to assist individuals with better understanding their career development as well as with the retrieval of occupational and educational information. In addition to providing the functions of the previously described on-line information type, these systems add content and functions which traditionally have been done in one-to-one counseling, or in group counseling or instruction, e.g., clarifying values, teaching career decision-making. They attempt to analyze and systematize a more complete career decision-making process, e.g., understanding values and interests, relating values to occupations, comparing occupations, strategizing occupations, and planning training. Such systems have given emphasis to the teaching of a decision-making process which hopefully can be used again in subsequent career decision-making.

In addition, guidance systems of this type store records for individual users. The storing of these records by unique number or code allows the use of prestored data (grades, interests, aptitudes, skills, values) in the decision-making process. Having the capability of individualized records provides for personalization such as calling the user by name, reviewing one's last use of the system, or confronting the user with inconsistencies in the decision-making process.

Figure 2 illustrates an information-guidance continuum on which one might differentiate between several leading on-line systems. The left side of the chart is strictly the access and retrieval information type systems, mainly with the capability of accessing national and localized information data bases. Systems near the right side of the chart provide for computer-assisted instruction (CAI) on career guidance topics, including values, decision-making, organization of occupations, as well as access to large data files. In addition, this type may include on-line testing and/or interpretation, simulation, or gaming.

FIGURE 2

RELATIVE PLACEMENT OF LEADING COMPUTERIZED SYSTEMS
ON AN INFORMATION - GUIDANCE CONTINUUM



CHARACTERISTICS

- . focuses primarily on information access and retrieval
- . provides trait factor link between interests and occupations

CHARACTERISTICS

- . prime importance placed upon teaching a decision-making or valuing process
- . provides a planning function for user

ADVANTAGES

- . should relieve counselors of some work
- . will provide users with additional information services
- . permits most of the data bases to be localized

ADVANTAGES

- . should relieve counselors of significant work
- . provides users with personalized pre-structured dialogues of a guidance nature
- . stores and uses records of personal data

Super (1970, p. 120) noted this type of continuum a decade ago, suggesting that two theoretical guidance approaches underlie efforts in the field. Information systems take a "pragmatic career approach, which seeks to improve what the counselor now does or would like to do in making information available to students." He also indicated "...that vocational choices will be improved by the possession of better information about occupations, better self-knowledge, and sound reasoning concerning the relationship of self to occupational data." Super commented that "this pragmatic approach is that which is likely soon to produce the first generally useable system of interactive computer assisted guidance --- it uses the power of the machine to perform tasks that are already understood and practiced by human beings in well-staffed and well-equipped schools." Super called the second approach developmental decision-making theory. He suggested that it would have great appeal for counselors "who are more concerned with human development than they are with educational or occupational choices." Super described this focus on teaching how to make choices as a most formidable task, one that will involve pioneering in the development of the materials, methods, and procedures of the system as well as in adapting them to the computer.

DESCRIPTIVE INFORMATION ON LEADING COMPUTERIZED SYSTEMS

In approaching this paper, the author was aware of several considerations concerning various systems developed to date. Making some of these more clear may be helpful in better understanding the structure of this section.

First, a group of systems stands out as leaders in the field of computerized guidance and information. Most have demonstrated their effectiveness over a period of time, have a sizable population of users, and have an organization that provides marketing services, implementation assistance, and system development. Several other computerized systems are operational in various parts of the United States and Canada but do not meet most of the above criteria.

Moreover, with the exception of some marketing information, there exists very little comparative data between these leading systems. In the next section of this paper, we note that systems studied were generally well liked and judged easy to use and relevant by their target audiences. However, the reader should be aware that

system developers differ in terms of their underlying assumptions about what students and clients need in order to support intelligent career exploration and choice. Therefore, differences surface in the kinds of functions the computer carries out with the user, the quantity and quality of data bases, the length of time a user is on the system, and the delivery cost. Stern characterizes these points by noting that "with some systems, the focus was on the computerization of a particular guidance process which subscribes to one counseling theory or another. He indicated that "others focused purely on the mechanics of information retrieval, giving short shrift to complex processes which attempt to match personal and occupational characteristics. Some emphasized both the retrieval and the use of information for career guidance." (Stern, 1975, p. 200)

Costs are invariably one of the important considerations in installing computerized guidance and information systems. Some authorities maintain that it would require the services of an outstanding cost accountant and a recognized computer expert to answer assuredly, after considerable study, just one of the questions that arise about the comparative cost. Many cost variables abound -- existing hardware, short- and long-range software development and/or lease arrangements from system developers, computer transmission requirements, local data base development, etc. These variables make it impractical to handle comparative costs adequately in this paper. However, in considering the cost in moving to computerized systems, agency and school administrators must consider the expense of providing more one-to-one career counseling. If adding staff is out of the question, then computerization of some of the counselor's functions may be viewed as economically efficient.

Most system organizations are in a very competitive mode of operation at the present. No doubt this is a reflection of the behavior of survival. Competition has a positive aspect in that it provides motivation for continued system enhancements, hence raising, to a degree, system quality. But the fact remains that most of the leading systems have been developed either totally or partially from public funding, that is, resources that are sorely needed but are no longer available. If future federal policy were to foster cooperative efforts between systems rather than an atmosphere of competition, the possible benefits to users could be enormous.

A further consideration is the relationship between the system and the setting within which it is placed. Thal-Larsen and Parrish state, "The mere presence of such a delivery system is not tantamount to the existence of an infrastructure of sound counseling practice. The relationship of the system to the total guidance program -- to counselors, teachers, students, parents, and the outside community -- is surely a more important determinant of the goodness of the system's outcome than are the hardware and telecommunications it utilizes" (Thal-Larsen and Parrish, 1975, p. 85). Integrating computerized systems into school or social agencies require the blending of hardware, people, and setting which results in various procedures and equipment constituting an organic whole.

Because of these considerations, caution may have been signaled on the part of the reader in finding the "ideal" system. Each of the computerized systems described, seemingly, will have its own personality, possibly reflecting to some degree the characteristics of its developers and the motivations that surrounded its development. However, there might be a "better" delivery system or systems for a particular setting or a state that is just entering the field.

LEADING SYSTEMS

To determine on which variables to report information about leading systems, the writer conducted a mini-survey with counselors, school and agency administrators, and others to determine what they felt they needed to know prior to adopting a system. A questionnaire was devised and sent to system developers and representatives. Coupled with information obtained directly from system developers and from several reports (Stern, 1974; Thal-Larsen and Parrish, 1975; Morgan, 1978), Figure 3 was compiled. Hopefully, it will prove helpful in understanding the systems' characteristics.

As one of their principal functions, all the systems assist the user to select relevant occupations from the list of titles contained in the system. As briefly noted in Figure 3 under the heading, "Accessing Strategy(s)," the structured search is unique between systems and is worth a much deeper study than this paper will address. Several of the systems, however, do publish extensive documentation on these strategies that can be obtained by writing to the systems organization. (See Appendix B.) In addition, several of the information-type systems have or are adding off-line

FIGURE 3
SYSTEMS DESCRIPTIONS

SYSTEMS	VARIABLES DATA/DEVELOPER OR REPRESENTATIVE	SETTINGS USED
CIS (Career Information)	1969 (OIAS) Dr. Bruce McKinlay-Oregon CIS, 247 Hendricks Hall, University of Oregon, Eugene, OR 97403	Secondary schools; Voc/Tech & Comm. Coll.; 4 year colleges/corrections CETA Voc. Rehab. and others
CHOICES (Computerized Heuristic OCC. Info. and Career Exploration System)	1976 Phillip S. Jarvis Canada Emp. & Immigration Commission, 5th Floor, Phase IV, Place du Portage- Hull, Quebec, Canada	Employment offices; some high schools, community colleges and universities
COIN (Coordinated Occupational Information Network)	1978 Dr. Rodney Durgan COIN, Inc., 1230 West Wooster, Bowling Green, Ohio 43402	Secondary schools, CETA, Voc. Rehab. and others
CVIS (Computerized Vocational Information System)	1967 Carol M. Rabush CVIS Distribution Center Western Maryland College Westminster, Maryland 21157	Secondary schools, 2 & 4 year colleges
DISCOVER	1976 Dr. JoAnn Harris- Bowlesbey, DISCOVER Foundation, Inc., Towson State University, Towson, Maryland 21204	Secondary schools 2-4 year colleges
GIS III (Guidance Information System)	1971 Linda Kobylarz TimeShare, 630 Oakwood Avenue, West Hartford, Connecticut 06110	Secondary schools, Voc/Tech. schools, CETA. Corrections, 2-4 year colleges, Voc. Rehab., and others
SIGI (System of Interactive Guidance and Information)	1972 Dr. Martin Katz Educational Testing Service Princeton, New Jersey 08591	2-4 year colleges, some high schools, manpower office private counseling

SYSTEMS	ASSESSING STRATEGY(S)	INFORMATION COMPONENTS
CIS	Structured Search: Quest 21 user preferences or any combination	OCC File(s): local OCCs (numbers vary between states); preparation; bibliography. Educ. File(s): training programs, colleges & Tech/Voc. Schools (local). Other Files: high schools, visit, summer jobs, and employer.
CHOICES	Structured Search: <i>EXPLORE</i> 150 user selected variables. Direct Access: To any file anytime; <i>Specific</i> info. on chosen OCC; <i>Compare</i> requirements for 2 or 3 OCCs; <i>Related</i> OCCs to use selected occupation. Offline: Choices travel guide; self-directed search; GATB & Canada interest test.	OCC File: 1,100 primary OCCs (OCCs localized into 12 provincial data files). Institutional File: all public postsecondary institutions in Canada; 47,500 unique training programs.
COIN	Structured Search: user created OCC <i>Profile</i> ; college search. Direct Access: to any file any time; self directed search.	OCC File: 280 OCCs (national data); capability of inserting local wage & outlook data. Edu. File(s): college majors; 2 & 4 year colleges; apprenticeship. Other Files: military, school subjects.
CVIS	Structured Search: compares student preferences to Holland's classifications; college search. Direct Access: to any file any time.	OCC File: 430 OCCs (national data) Edu. File(s): 1600 institutions in college search file. Other(s): military script.
DISCOVER	Guidance Process: learning modules on values, interests & competencies, decision making, career planning, grouping OCCs, and job search. Direct access Module #6 "Getting Info. about OCCs".	OCC File: 450+ OCCs (national data) Edu. File: 1,000 2 year colleges; 1,100 tech. schools; 600 graduate schools; 450 military training programs; financial aid; apprentice.

SYSTEMS	ASSESSING STRATEGY(S)	INFORMATION COMPONENTS
GIS - III	Structured Search: user selected variables. Direct Access: not reported.	OCC File: 850 OCCs (national data); several state files. Educ. File(s): 1600+ 4 year colleges; 1400 2 year colleges; graduate schools. Other Files: job bank; armed services; scholarship & career resource.
SIGI	Guidance Process: <i>Values</i> clarification extensive (10 OCC Values examined): <i>Locate</i> relates values to OCCs <i>Compare</i> OCCs on various topics <i>Strategy</i> matches values, OCCs and predictions. <i>Prediction</i> or college programs (must be localized) <i>Planning</i> relates training to OCCs (must be localized).	Educational File: national data.

SYSTEMS	JOB SEARCH	VARIED MEDIA
CIS	Refers user to employment services	Needle - sort cards (Quest); printed OCCs & educational information, and microfiche
CHOICES	Compatible with Canada's METRO Order processing system (job bank)	Print OCCs
COIN	South Carolina job bank to added	Microfiche
CVIS	Some CVIS versions tied to local job banks	no
DISCOVER	Local jobs module leads to local information or job employment services, job bank, job search information, resume and interview information	no
GIS - III	no	Microfiche
SIGI	no	no

SYSTEMS	OTHER LANGUAGES	OTHER FEATURES
CIS	no	Extensive information development at state level; implemented in wide range of settings as a statewide information system (8 states)
CHOICES	French (Spanish and German to be added)	Very flexible accessing OCCs
COIN	no	---
CVIS	no	Very flexible accessing OCCs or colleges
DISCOVER	no	Entry module for new users; online evaluation component extensive assistance with values, decision making, and career planning
GIS - III	no	Implemented in wide range of settings and in several states (GIS - III version)
SIGI	no	Extensive assistance with understanding values; EDUNET computer network (to be added)

counseling/guidance techniques, tests, and instructional modules that are designed to mesh with the system's data base and on-line activities. CHOICES and COIN are developing linkages with the Ohio Vocational Interest Survey (OVIS), CIS has linked its occupational data base to the Strong-Campbell Interest Survey, and so on.

Another important function of these systems is their attempt to make the path between education and work more clear. This problem has plagued many counselors over the years. In asking the question regarding how the system links occupational and educational information, the several system developers or representatives responded in a number of ways.

Harris-Bowlsbey stated that in DISCOVER, the user makes tentative vocational choices based upon self information. The system then tells the student the possible roads of training to occupations selected and provides search strategies. Rabush responded that CVIS uses the Roe System of classification. Students choose one to six levels of education and one of eight areas of interest. Based on this choice, the computer displays occupational titles which the student may explore. Students then move to scripts on four-year colleges, technical schools, apprenticeships and/or the military to find programs which provide training for occupations. McKinlay stated that CIS reflects the complex relations of education and work through a special form of indirect linkage. This indirect linkage helps users identify all the relevant routes to careers in any field. Much of this information is contained in the system's unique "preparation" file which identifies and compares the various ways of qualifying for a chosen occupation. In CHOICES, Jarvis noted a linkage component which allows movement in either direction -- occupations to institutions or institutions to occupations.

Figure 4 is provided so that counselors and administrators from agencies or schools might view at a glance a number of system and organizational variables. Although the author took care in studying a variety of system pamphlets, manuals, and other documents, some misinterpretations may be inevitable. It is most important for the reader to become aware of the important variables in understanding each system's unique qualities.

FIGURE 4

ADMINISTRATIVE INFORMATION

SYSTEMS	RECOMMENDED STAFFING	READING LEVEL
CIS	Paraprofessional or clerical assistance or independent use	- - -
CHOICES	Counselor mediation for optimal results Independent usage possible	- - -
COIN	Not reported	- - -
CVIS	Counselor mediation recommended; Independent use possible	6th grade
DISCOVER	Paraprofessional on standby	H.S. level - 8th or 9th grade. college/ adult level - 11th or 12th grade
GIS	Paraprofessionals, student assistant, volunteers, assistants	- - -
SIGI	Independent use; or linked to career development courses, counselor interviews	8th grade

Special caution should be taken in the column titled "Time/Cost". Although reported by system developers and representatives, the figures represent approximations and may change depending on the cost configuration at a particular user site. The "Reading Level" column also should be examined with caution.

Several system developers hesitate to report reading level due to its difficulty to determine. Various components of their systems appear to have a higher or lower reading level depending upon the particular content being studied. Even within a component, certain phraseology or descriptive words (that is, occupational titles) tend to skew the level two or three grades. Suffice it to say that there also are differences between various reading tests applied to the same material. It is this writer's opinion that system developers are very conscious of keeping the readability of their systems within reach of their targeted audiences and, hence, take care in how complex material is presented. Further information on these leading systems can be obtained by writing directly to systems' developers and representatives. Appendix B also should prove helpful in selecting and ordering particular publications.

OTHER DEVELOPING SYSTEMS

The recent interest from the DOL's United States Employment Service (USES) in studying the "on-line" computerization of employment counseling processes, testing, and information services for clients could prove interesting. What this might mean is the creation of a new system for Employment Service offices or extensive modification of one of the existing ones. At present, a feasibility study for computerizing the Oregon Employment Service's SEARCH Program is being funded by USES. This system is a batch-process or computer-assisted program that assists users in exploring occupations through the use of the General Aptitude Test Battery (GATB) and the Worker Trait Group Inventory (SEARCH, 1978). On-line administration of the GATB, including the possibility of significantly reducing test-taking time, will be investigated.

The Genessee Intermediate School District in Flint, Michigan, has run their Educational and Career Exploration System (ECES) successfully for a number of years (ECES IV, 1977). Combining delivery media, ECES IV utilizes on-line computer technology, color filmstrips, and microfiche presentations to assist users in

exploring occupations and education options, learning career decision making and employability skills, and in establishing their career plans.

Other computerized systems exist but are beyond the scope of this paper.

No amount of system literature, descriptive information, or discussion of capability can substitute for a "hands-on" experience with a system. Since all systems are sufficiently complex, especially those of the counseling/guidance type, this prohibits sufficient comparison by charts or other means. Nuances and intricate processing logic are contained in all systems and best "discovered" by use.

A REVIEW OF THE LITERATURE ON SYSTEM RESEARCH AND EVALUATION

In previous sections we described the considerable activity in introducing computer technology into the career guidance and counseling field. One must then ask the question: what has all this meant to special groups of system users and to individuals in helping them with their individual career decision-making? What has been the impact on secondary school students, on college or university students, and on those adults who have used these systems in social agency settings?

Seven of the systems (CACE, CIS, CVIS, DISCOVER, ECES, GIS, and SIGI) and their adaptations have been the object of evaluations which in some manner address the issue of the impact of computer-based systems on users. These evaluations generally address other issues as well, such as ease of use of the system and how well individuals enjoyed the system and felt it met their needs. The systems were all well liked and were judged easy to use and relevant to target audiences. This review of the studies, therefore, will simply state this position feedback and not repeat it for each study.

The issue of impact is less clear-cut. A wide assortment of approaches and instruments have been used in these evaluations to measure several aspects of impact. In general, the users were examined relatively soon after they had exposure to the system, although sometimes they had used the system several times in a six-month period. One study covered a group of students after two years of system usage.

An extensive review of the literature, questionnaires, and personal requests to system developers produced the information on evaluations examined here. Three population groups have been the target of these studies: junior high and high school students, postsecondary education students, and adults in social agency or institutional settings.

JUNIOR HIGH SCHOOL - HIGH SCHOOL POPULATION

The populations which have been evaluated most frequently are junior high school and high school students. Impellitteri detailed an evaluation using junior high students in the 1968 final report on his Computer Assisted Career Exploration System (CACE). In this study, 194 CACE students were compared with a control group of 152 students. The CACE users spent an average of four to five 40-minute sessions with the terminal from September to March. An Occupational Values Inventory, an Occupational Projections Inventory, and a General Knowledge of Occupations Test, all developed by Impellitteri and his colleagues, were administered as pre- and post-tests. There was some change in occupational projection in the CACE group. No difference was found between the CACE and the control groups concerning occupational choices. However, the CACE group's knowledge concerning specific occupations rose 9.5 percent, with greatest gains concerning training requirements and job duties knowledge (Impellitteri, 1968).

In 1969, a project report was released concerning use of CVIS with high school and college students. In reply to a questionnaire, the majority of students indicated that the computer suggested occupations which they could explore further; they also noted that they learned something about themselves from using the system (*A Project Report on CVIS, 1969*).

Melhus used CVIS to compare computer-assisted vocational choice with traditional counseling. Using Education Development Tests, sophomores were divided into low ability/counseling readiness and high ability/counseling readiness groups. These groups were then divided into CVIS and traditional counseling groups of 54 students each. In the pre- and post-test phase, students were administered Hershenson's Occupational Plans Questionnaire. Melhus found no significant difference between working with a computer and working with a counselor concerning counseling satisfaction in the high group. However, the low counselor group made significantly more

change than the CVIS group. Also, the least satisfied group was the CVIS low category. He concluded that computerized vocational counseling was more effective when used with students resembling those falling into the high samples of the study and that the human counselor was more effective and has a vital role to play with students resembling those who fell into the low samples of the study. He also suggested that counseling be redistributed so high students have more computer and less counselor guidance, thereby leaving counselors freer to work with students needing more human attention and support (Melhus, 1971).

The CVIS Phase VI Final Report was released in 1971. Using three Illinois high schools, an evaluation questionnaire provided the source of the data. In general, students felt CVIS helped them relate their ability, grades, educational plans, and interests in jobs. Of 61.6 percent who began with an occupation in mind, 58.4 percent had not changed their minds; however, of 38.4 percent who had no occupation in mind, 58.3 percent said that after using CVIS they had two or more occupations in mind which they planned to explore. The same type of results were found with the college information and pre-CVIS, post-CVIS comparisons (CVIS Phase VI Final Report, 1971).

Harris compared 66 CVIS users with 65 control students. Instruments used for pre- and post-testing were Super's Career Development Inventory and Harris' Vocational Plans Questionnaire. Students used CVIS four times between January and March. She concluded that using CVIS did not significantly increase the number of occupations sophomores viewed as personal options, nor did it increase the degree of congruence between stated educational/vocational aspiration level and objective data about grades and measured ability. However, it did significantly increase the accuracy and range of information which students possess about their chosen occupations; it also increased their vocational maturity, specifically awareness of the need to plan and knowledge of resources for exploration (Harris, 1972).

Maola, focusing on CVIS, studied high school Occupational Work Experience students. The students were randomly assigned to CVIS, traditional counseling, or a control group, with 34 in each group. The CVIS and traditional group both received identical materials -- only the mode of delivery differed. Maola used the Assessment of Career Development to test students on Knowledge of Occupational Characteristics, Knowledge of Occupational Requirements, and

Career Planning Knowledge. He found the CVIS group scored significantly higher than the traditional group who scored significantly higher than the control group. He concluded that a computer-assisted occupational information system can teach occupational information better than a counselor-based occupational information system. He also recommended that the results be investigated longitudinally (Maola, 1974).

During 1971, a series of field tests were conducted on CIS (then called OIAS), one of which took place in an Oregon high school. The study by McKinlay and Adams contrasted 126 CIS users with a control group of 143 students by having them complete a questionnaire. The list of occupations the system produced gave 70 percent of the users some occupations they would seriously consider for future work. More students were certain of career plans after system use and were more certain of their goals than the control group. Students also were requested to describe employment prospects for an occupation they would like to follow as a career. The CIS group scored significantly higher than the control group when their responses were compared to labor market data. Parents also were asked to complete a questionnaire. Findings indicated that approximately two-thirds of the students discussed CIS and their career plans with their parents, some for as long as three hours total (McKinlay and Adams, 1971).

CIS was evaluated more recently by Jones in 1976. In her study, CIS -- as it has been adapted in the Colorado Career Information System (COCIS) -- was examined. A total of 41 COCIS users, 47 students receiving traditional counseling, and 46 control students were administered the Competence Test of the Career Maturity Inventory (Crites) and a Survey of Occupational Knowledge constructed by Jones. The COCIS students each had a one-hour computer session; the traditional group underwent one-to-one counseling sessions of a similar length. She found no difference among the three groups concerning ability to make reasonable vocational choices. There was, however, a significant difference in knowledge of specific occupational characteristics between the COCIS and traditional group, and the computer and the control group, while there was no significant difference between the traditional and the control group. Jones concluded that the computer program was effective in teaching specific career knowledge regardless of the level of career maturity (Jones, 1976).

During 1976, COCIS was evaluated by Wolff in two high schools and two colleges in Colorado with 579 students. Pre- and post-questionnaires were administered to all students. Before and after system use, students were requested to list three occupations that interested them. Twenty-nine percent indicated no change in occupational choice, 24 percent indicated one change, 25 percent two changes, and 21 percent three changes. After using COCIS, 25 percent of these same students were more certain of their occupational choices, 16 percent were less certain, while the others remained at the same level of certainty. When asked with whom they planned to talk about their career plans after using the system, 49 percent indicated parents, 18 percent teachers, 49 percent counselors, 35 percent friends, and 10 percent said no one (Wolff, 1976).

During the 1977-78 school year, the Wisconsin Career Information System (an adaptation of GIS) collected questionnaires from 147 students in five Wisconsin high schools. Dominantly, they liked the system and felt it to be relevant to their current information needs. One-third of those questioned reported expanding the number of occupations they were interested in as a result of using WCIS. Another one-third narrowed the number of occupations which interested them. In short, the literature gathered from several of the career information systems indicated that users often obtained new occupational titles to explore, thus expanding their previous list. Others found the system helpful in finding reasons to eliminate occupations, thus tending to narrow career alternatives (Career Currents, 1979).

A field trial conducted in 1976 by Harris-Bowlsbey, Rayman, and Bryson studied 44 DISCOVER users and 44 students in a control group. Each was given the Assessment of Career Development, the Career Development Inventory, four questionnaires, and an interview, all as post-tests. Of the DISCOVER group, 25 percent noted that using DISCOVER caused them to talk to people who are in occupations they were interested in. The system was discussed with parents by 38 percent of the users. Before use of the system, 14 percent had no idea about their future vocational plans; afterward none indicated that response. There was no significant difference between the two groups on the Assessment of Career Development or the Career Development Inventory (Bowlsbey, Rayman, and Bryson, 1976).

A 1976 evaluation of Educational and Career Exploration System (ECES) in a New Jersey high school involved 156 ECES users and 60 control students. Instruments used included the Super Work Values Inventory, the Holland Vocational Preference Inventory, Knowledge of Decision-Making Principles, and a Vocational and Educational Planning Maturity Questionnaire. The instruments were used as pre- and post-tests. ECES students scored a higher increase in the amount of knowledge they believed they knew. Concerning the other scales, no significant differences were found between the ECES and control group (Bohn, Lindeman, and Super, 1970).

Lindeman et al. conducted a county-wide evaluation using 3,201 ECES users, 2,386 control students, and 114 counselors in 35 Michigan high schools. Students completed the Career Development Inventory. The report of the research indicated that significant differences between ECES users and nonusers were found only among students from urban schools where there was a substantial number of black students enrolled. However, the difference was small, approximately one-fourth of a standard deviation (Lindeman et al., 1972).

A two-year study by Elridge and Smith using ECES (the only longitudinal study this reviewer encountered) centered around comparing traditional counseling with computer-based counseling for disadvantaged youth. One hundred eighty-eight eleventh-grade students who had used ECES since the ninth grade comprised the experimental group. The control group included 158 students counseled traditionally. The study found that significant differences generally favored males and traditional counseling. ECES more effectively furnished details concerning occupations. (Elridge and Smith, 1972).

A System of Interactive Guidance and Information (SIGI) pilot study by Chapman, Norris and Katz involved high school seniors as well as community college students. After a total of three hours of terminal use, 31 SIGI students and 30 control students completed interview questions, a questionnaire, and an information test. The study found a significant difference (based on interviews with students) concerning the extent and nature of the students' career planning between SIGI users and nonusers. Although 7 of the 31 users were still uncertain concerning which occupation to pursue, the other 24 felt SIGI had helped them make progress toward a decision (Chapman, Norris, and Katz, 1973).

POSTSECONDARY POPULATIONS

Another population group evaluated was postsecondary students from community colleges, city colleges, and universities. A survey of the literature found evaluations reported on two systems, SIGI and CIS.

Ross conducted a study of traditional counseling versus CIS (OIAS). He administered a telephone questionnaire to 50 students who used CIS and 35 who had used the college's counseling center. Five CIS users and 14 counseling center users reported changing career plans. Ross noted that in light of the differences in system purposes, both OIAS and the Counseling Center fared well in regard to influencing users' career plans. Fourteen CIS users and 21 career center users reported increased career certainty. However, Ross noted that a much larger percentage of OIAS users than counseling center users were certain of future careers before assessing information (Ross, 1971).

A 1976 study reported by Rosenberg contrasted four sample groups of college freshmen and sophomores to assess the impact of employment outlook occupational information on the decision-making of students. Group 1 received group counseling; group 2 used the Colorado Career Information System (COCIS); group 3 used COCIS and participated in group counseling; group 4 also was tested. The groups, consisting of 24 students each, listed the occupations they were considering after treatment. Findings showed the most effective treatment to be a combination of computer and traditional counseling (group 3) based on their choices of occupations with high and average employment prospects and their declarations of a major area of study (Rosenberg, 1976).

SIGI has been studied rather extensively at the postsecondary level. A study by Warren with a SIGI group of 48 and a control group of 24 college students used the Harren Vocational Decision-Making Checklist. (A written occupational information test and structured interviews also were utilized; however, results were not available when the report was written.) Findings of a pre- and post-test showed SIGI to be effective in enhancing the decision-making process relative to a choice of a major (Warren, 1976).

Pyle studied the relationship of group career counseling and the career maturity of community college students. Students enrolled in a behavioral science elective were divided in groups, one using SIGI, one not. Sixty-six students participated. The results of the Career Maturity Inventory (Crites) show the SIGI students tested significantly higher (at the .01 level) in career choice attitude than the control group (Pyle, 1966).

At the University of California-Irvine, pre- and post-questionnaires were administered to 65 students who had used SIGI. Two-thirds of those students rated SIGI excellent in helping them to discover careers consistent with their values. The percentage of students who knew exactly which career to pursue and those who had no specific career in mind both decreased, hence increasing the number of students who were considering two or more, or three or more, occupations (University of California-Irvine, 1976).

Another study contrasting SIGI with traditional counseling was conducted by Risser and Tulley. Two hundred fifty SIGI and 280 control students completed the SIGI Evaluation Questionnaire, the Occupational Information Questionnaire, and the Student Questionnaire. The SIGI students had follow-up counseling with SIGI counselors; the control group received traditional vocational guidance and testing. Students who used SIGI rated themselves as more satisfied and confident with their vocational plans and less in need of further career guidance assistance than the control group. They also rated themselves as having more knowledge concerning course requirements and entry-level requirements for their chosen careers (Risser and Tulley, 1977).

According to a SIGI evaluation by Willingham, 81 percent of the SIGI users at a New Jersey community college felt they knew their values as related to their career choice; only 23 percent of the control group expressed that confidence. Students, after using SIGI, who were considering changing their career choice were asked the reasons why. The most common reply was that the original career choice was not compatible with the student's values (Willingham, 1978).

A California State Polytechnic University study also utilized SIGI. In reply to pre- and post-questionnaires, SIGI students showed a significant increase in choosing a career. Of 317 students, 213 gave it the highest rating on a Likert scale for

helping them become more aware of their values; 216 rated it highest for showing them the relationship between values and career decisions. In reply to the question "Now that you have finished SIGI, what are you going to do next?" only four answered that they were not planning any further research; 122 planned to "think about it for awhile"; 107 were going to "talk with a member of the Career Planning and Placement staff" (Fredericksen, 1978).

(Note: The National Institute for the Deaf, part of the Rochester Institute of Technology, has been using SIGI for one year. They are currently planning a comprehensive evaluation of SIGI with deaf students to study, among other things, how well they comprehend the decision-making concepts communicated by SIGI and the extent to which SIGI aids them in focusing on a major area of study.)

NON-SCHOOL ADULT POPULATION

To date, the only studies found dealing with the non-school adult population have been done with users of CIS (OIAS). Weick conducted a pilot study using CIS in three Employment Service offices. The experimental group consisted of 261 clients; 66 clients were in the control group. The instruments used were client questionnaires, counselor questionnaires, and client/counselor interviews. The study concluded that OIAS usage stimulated exploratory activity and introduced more order into the decision-making and counseling process (Weick, 1972).

Inmates in a state correctional institution and a state penitentiary composed the target population for a 1975 CIS evaluation by McKinlay and Franklin. In reply to a questionnaire completed by 67 inmates, using CIS caused 19 percent, 26 percent, and 3 percent respectively, to change their first choice of career field, educational program, and school. Many of those who did not change their choice (22 percent, 36 percent, and 13 percent respectively) became more certain of their choice. (McKinlay and Franklin, 1975).

SUMMARY AND RECOMMENDATIONS

In summary, two general conclusions emerge from the review of the studies:

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1. Computerized information and guidance systems enhance the retention of occupational information (Impellitteri, 1968; Harris, 1972; Maola, 1974; McKinlay and Adams, 1971; Jones, 1976; Elridge and Smith, 1972; Risser and Tulley, 1977).
 2. Computerized systems effect changes in career certainty (McKinlay and Adams, 1971; Chapman, Norris, Katz, 1973; Ross, 1971; Willingham, 1978; McKinlay and Franklin, 1975).

There is a lack of consistency concerning various results from traditional versus computerized counseling. However, one objective of the systems is to be integrated into the counseling program. They are designed to provide information and sometimes counseling; however, their maximum benefit is derived when they are used as one of the resources a student uses in addition to a counselor. Therefore, to evaluate them separately from a counseling program, a study must create a set of circumstances unintended by the systems.

Another extremely variable finding centers around the amount or lack of increase in vocational maturity/development brought about by use of the various systems. Jones addressed this issue:

According to Crites, the assumption that vocational behaviors mature over time in a systematic fashion was implicit in the construction of the Career Maturity Inventory. Thus, the process of career awareness and career maturity would be developmental rather than momentary. This assumption was in accordance with the theories of Super and Overstreet, Teideman and O'Hara, and others. (Jones, 1976, p. 82)

Yet students generally have been given maturity inventories as part of short-term studies. Although some of the variance in findings may be due to system differences, for short-term evaluation perhaps another type of instrument would better evaluate impact since career development is a long-term process.

Several aspects of the evaluations suggest areas which need further research. No true longitudinal study to date has evaluated the impact of use of a computerized system on a group of users over time. However, it has been reported that the system developed in Canada, CHOICES, instigated a comprehensive longitudinal study beginning in September, 1976.

Another area needing research is data concerning the use and subsequent evaluation of computerized systems with non-school adults. CIS had done some evaluation in this area (e.g., Weick, 1972; McKinlay and Franklin, 1975). However, there is very much more to learn. Adults in social agency and institutional settings as well as others are undergoing career changes. Their needs vary from broad awareness of what occupations exist to specific information and guidance; yet this population remains overlooked by most of the systems.

Some weaknesses in the evaluations also seem apparent. Many draw extensive conclusions from questionnaires which ask mainly for student opinion. The questionnaire phrasing is often vague. The studies using author-created tests and questionnaires make no mention of proven validity of the instruments. Also, most of the evaluations have been conducted by the systems, hence, raising the question of objectivity. Lastly, sample sizes of some groups were extremely small.

More external evaluations seem in order, with the goal being not a competitive comparing or contrasting of systems (since minimum standards are beginning to emerge), but a discovery of their individual strengths, of the best ways to utilize the systems in various settings, and of system data bases and process areas needing improvement and/or expansion. This reviewer was made aware recently of a grant from the National Institute of Education to the Educational Testing Service in order to study sources of occupational information and evaluate delivery systems used in high schools. This two-year study should help fill some of the voids that presently exist.

In addition, productive research could be conducted in the area of how counselor behaviors have been affected by the introduction of a computer into their domain. Several questions in this area should be explored: How have students, teachers, administrators, parents, and the public reacted to the automation of some aspects of counseling? How do they view this use of technology to create a more systematic approach to collecting, storing, and disseminating career information? Have the image, worth, and effectiveness of counselors been enhanced? What do counselors themselves think of these new career guidance and counseling tools?

As with most areas of endeavor, the definition of what constitutes progress is elusive. It is usually tied to a sufficient number of complex variables, including individual value systems. This

makes the task of stating clear advantages and disadvantages somewhat formidable. Nevertheless, there is much to be done before leaders in the field can rest comfortably with their accomplishments.

CONCLUSIONS AND RECOMMENDATIONS

The complexities in career choice and the need for better individual career planning have given rise to applying computer technology in career information, guidance, and counseling endeavors. Computerized career guidance and information systems have, and will continue to have, positive effects on career development activities and programs. What is called for now is the emergence of an organized plan to give order, balance, and financial support to the growth and continued development of existing systems.

As a result of recent discussions with several system developers and professional involvement at both the system operation and user levels for the past decade, this reviewer would conclude that certain issues in the field need closer inspection and resolution.

Proliferation of computer hardware and software has driven up the developmental and operational cost of most systems. In fact, the availability of computer software continues to be a major factor on which a choice of system is being made. This writer seriously questions whether hardware and software should be a major factor in differentiating between systems. Nevertheless, several realities exist. (1) With little or no standardization of computer hardware among the various user settings, systems are forced to keep developing software to run on existing hardware. (2) Computer technology continues to make advances, thus, requiring changes and modifications to the software. (3) Most systems are constantly making enhancements, thus requiring periodic updating of the software. One of the most promising advances in the technology may be the development of low-cost microcomputers. Although all system developers are considering the implications of this new technology on their delivery systems, there appears to be little thought for joint software development exploration of the feasibility of a hardware vendor manufacturing a machine with unique features for career guidance and information systems.

Outside of a few systems, developers and their organizations have spent a much greater effort in marketing systems than in evaluating their purported attributes. In some instances, the expertise for designing adequate evaluation models has been a limiting factor. However, funds to do both have not been forthcoming from either the users or federal grants. Consequently, marketing has been the more pragmatic choice. Funds from the federal level for evaluation conducted by independent vendors in consultation with system developers would enhance the state-of-the-art immeasurably.

Concomitant with the development and marketing of systems must come the training of career guidance and counseling personnel to use the tools effectively. Although systems publish a number of manuals and handbooks, it was disappointing to learn that some do little in the area of staff development. Users should insist on initial and periodic staff training that includes system operation and discussion of implementation strategies as well as written handbooks and manuals. In addition, counselor educators could do much more to bring about a better understanding of the capability and use of these tools, possibly preparing their students to enter the counseling field well ahead of the practitioner in this significant activity.

Near the heart of this activity is the question of information quality. Several system developers were explicit in reporting the need for better sources of occupational and educational data. It also would appear that the methodology for processing the data into information could be substantially upgraded. A greater focus should be turned toward what constitutes acceptable quality in the systems' information files, e.g., currency, the degree of localization and depth for various topics such as wages, job outlook, and occupational preparation, etc. Much more technical assistance is needed to improve the present methods used in data conversion. Expertise does exist in the field of information development; however, presently it is not organized effectively. A national institute to train information development personnel who can do the needed occupational and educational analysis work with sophistication is clearly called for.

In addition, the standardization of occupational and educational program taxonomies and topical categories would do much to facilitate information exchanges among states and the several systems. As indicated, the NOICC and SOICC are beginning to address these and other important issues related to computerized systems.

Although most of the systems have received public funding for at least part of the development, the leaders are presently most competitive. Cooperative system design or enhancement efforts between system developers have been practically nonexistent. One might wonder what benefits would accrue to the users and the state-of-the-art if policies and practices could be devised that fostered a sense of cooperative development, combined research and evaluation, and joint problem-solving among system developers and leading authorities in the field.

The time is ripe for leadership to emerge. Perhaps a National Career Information System Program that can provide fresh approaches to the plaguing problems, design incentives that can foster cooperation between system developers, and give direction to and support the growth of systems is the solution.

APPENDIX A

PROPOSED STANDARDS AND SELF-EVALUATION GUIDES FOR SYSTEM ASSESSMENT

Developed by:

**ASSOCIATION OF COMPUTER-BASED SYSTEMS
FOR CAREER INFORMATION (ACSCI)**

A National Consortium for
Accreditation, Training, and
Technical Assistance to advance
Computer-based Occupational and
Educational Information Systems
for Career Exploration and Planning.

Members include: Alabama, Colorado,
California, Massachusetts, Minnesota,
New York, Ohio, Oregon, Washington,
and Wisconsin.

ORGANIZATIONAL

Standard I. Organizational structure should include participation of key institutions representing both the producers and users of career information.

- 1) List the names of organizations which participate in the policy-making of your system.
- 2) How were these organizations selected?
- 3) Are there users of your system which are not represented by these organizations? If not, why not?

Standard II. A charter, constitution, or by-laws should govern the policies of the system.

- 1) Is a governing document available and up to date?
- 2) What formal and informal agreements are specified with the participating or supporting organizations?
- 3) What policies and/or procedures are adopted to carry out the charter, constitution or by-laws?
- 4) Does the charter, constitution or by-laws set the principal purpose of the organization as the development and computer-based delivery of career information?

Standard III. Management of the system is located within the system's defined area.

- 1) What is the system's service area?
- 2) Is the central office for the system located in the service area?
- 3) Are other offices organized to bring user services support to significant user populations?

Standard IV. The system should have a Director to coordinate and manage the operations, provide leadership to the organization's activity and serve as a liaison to advisory bodies.

-
- 1) Who is the Director?
 - 2) What are his/her qualifications for the job? Attach resume.
 - 3) Is he/she knowledgeable concerning system policies and operations? if not, why not?

Standard V. Professional staff members are available to develop information, manage the delivery system and assist user agencies in disseminating information to clients.

- 1) List the staff (by FTE). What are their assigned tasks?
- 2) Are key staff trained in appropriate academic disciplines and have they had training and experience which qualify them for their positions? Attach resumes.

Standard VI. Management should provide inservice training for existing and new staff.

- 1) What training needs have been identified?
- 2) What programs have been planned or initiated to satisfy these needs?

INFORMATION DEVELOPMENT

Career information is generally understood to include both occupational and educational information. Whether a system develops occupational information, or educational information, or both, it should operate a thorough information development program. A system delivering occupational information should meet Standards I-VII. A system delivering educational information should meet Standards VII-XIII.

Standard I. The number and types of occupations cover 90 percent of total employment in the system's service area.

- 1) What method was used for selecting occupations? Did the method employed use data on total employment? Comments from users and counselors? Utilize projected demand occupations based upon national, state and local surveys?

Standard II. In developing topics of occupational information, any topic selected should have an empirical base.

Standard III. A system should develop information which adequately describes the occupation. Occupational topics may include but not be limited to the following:

A. Dictionary of Occupational Titles - 9 digit codes

- 1) Is the DOT code based upon the fourth edition of the *Dictionary of Occupational Titles*.
- 2) Does the assigned DOT code reflect the contents of the occupational description?

B. Duties Topic

- 1) Does the duties topic describe the purpose of the occupation, the responsibilities held by employees and tasks performed?
- 2) Are the primary duties of the occupation identified?

C. Abilities Topic (these are natural abilities or capacities for learning rather than learned skills)

- 1) Are the primary abilities needed to perform the occupation identified?
- 2) Are the abilities described so that they are easily identified? e.g., working with hands versus manual dexterity.

D. Working Conditions topic

- 1) When appropriate, does the information contained in the topic describe the work setting; hours; physical demands; physical surroundings; hazards; pressures and travel requirements?

E. Equipment topic

- 1) When appropriate, does the information describe the tools and equipment used in the occupation?

-
- 2) If complex tools are used, is the function of the tools described?

F. Earnings

- 1) Does the earnings topic reflect the current beginning wage?
- 2) Are union and non-union wages identical?
- 3) Does the earning topic reflect wages for experienced workers?
- 4) Are salaries reported on an appropriate basis, i.e., hourly, weekly, monthly, or yearly?
- 5) Are wages reported to take into account regional differences of the state or nation?

G. Employment Outlook topic

- 1) Does the topic outline the projected employment for the occupation?
- 2) Does the topic identify factors which may influence the projected outlook, i.e., supply and demand.

H. Training and Education topic

- 1) Are high school courses listed which might be useful and/or required for a person entering this occupation? If relevant, are postsecondary courses identified?
- 2) Are on-the-job, apprenticeship or postsecondary programs identified?
- 3) If relevant, are licensing requirements identified?
- 4) If appropriate, is previous work experience identified as a method of preparation?

I. Methods of Entry

- 1) Does the topic describe all the common methods of entering the occupation?

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- 2) If the occupation is not entry level, what qualifies a person to enter the occupation?

Standard IV. Format, style and language levels of the occupational description will be presented so that they are easily understood by a diverse population.

- 1) What is the current reading level standard utilized? Why?
- 2) What method is currently used for determining the reading level of the occupational description?
- 3) Are the statements impartial? Are evaluative terms avoided, i.e., does it avoid orientation or biases toward one kind of work, career preparation, education or user over another?
- 4) Does the occupation description avoid racial, sexual and other status references in both the occupational titles and contents of the description?
- 5) Are the file descriptions appropriate to the terminal printout capability and the attention span of the user?

Standard V. A system should use data that are current and valid for developing occupational information.

- 1) Is the I.D. staff aware of the federal, state and local agencies which produce occupational data? Have they obtained copies?
- 2) Can the I.D. staff identify the strengths and limitations of the resources used?
- 3) What means are utilized for updating the library of printed resources? Are adequate monies budgeted for this task?
- 4) Do I.D. staff adequately document the resources used for developing occupational topics?

Standard VI. All occupational information is validated and updated at least yearly.

- 1) What procedures are outlined for I.D. staff in updating information? How frequently is the information updated?
- 2) Does the I.D. staff utilize a validation process for updating the occupational information?
 - a. How many validators review each occupation?
 - b. Are the validators employed in the occupation in which they are reviewing? When appropriate, are the validators representative of education, labor and industry?
 - c. How often are the descriptions reviewed?
 - d. What methods are used for recording validators' comments regarding this information?
 - e. Are validators' names, addresses and comments easily accessible to the I.D. staff?
 - f. Are adequate guidelines provided to the validators to assist them in reviewing the occupation?
 - g. How often are validators added or deleted from the validation process?
- 3) Are means provided for users and interested parties to provide feedback to the I.D. staff?

Standard VII. If an accessing strategy is used, an empirical relationship exists between characteristics of the user and those of the occupations or educational programs in the system.

- 1) What accessing strategy does the system use?
- 2) By what method is this relationship established?

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- 3) Is this relationship based upon standard research methodology?
 - 4) Does the I.D. staff understand the process of assigning/coding these traits? How?
 - 5) Does the text of the occupational information support the coding of these traits? How?
 - 6) Do the questions developed in the access strategy conform to current career development theory and practice? How?

Standard VIII. The number and types of postsecondary educational programs cover all significant instructional programs in the state or region served.

- 1) What method was used for selecting formal instructional programs?
- 2) Do the program files cover all significant instructional programs in the state or region served?

Standard IX. A system should develop information that adequately describes the basic characteristics of the program. Educational topics may include but not be limited to the following: program objectives, specialities, degrees conferred, sample courses, and a comprehensive list of schools offering the program. Whenever possible, an occupational objective should be given for programs, but do not force explicit occupational objectives when there are none.

- 1) What method was used for collecting information about what schools are offering specific programs?
- 2) Were the lists of schools offering programs validated? How?
- 3) Are all schools in the system represented in the program files?
- 4) Are occupational objectives data supported?

Standard X. The number and types of postsecondary educational institutions includes only schools that are accredited or licensed by recognized organizations.

- 1) What schools are included in system information files?
- 2) What organization accredits or licenses them?
- 3) Can information about school openings and closings be obtained during the year?

Standard XI. School information topics may include, but not be limited to, information about general information, admissions, housing, costs, financial aid, and student services. Other detailed information can be provided as available and applicable.

- 1) What information items are included for schools in the system?

Standard XII. Formatting information about schools should be consistent in reporting to enhance comparability of information items among schools.

- 1) Do information items cover similar subjects to enable the user to compare information items for several schools?

Standard XIII. Systems may have additional files appropriate to their needs which enhance system capability.

- 1) What are these files?
- 2) What is the purpose of each file?
- 3) Are these files developed and maintained in accordance with occupational and educational files previously described (i.e., updated annually, accurate, comprehensive, etc.)?

MARKETING AND USER SERVICES

Standard I. A marketing plan is being followed.

- 1) How is the population to be served identified?
- 2) How are key people/agencies identified?
- 3) How are procedures for marketing spelled out?
- 4) How are rate structures identified?
- 5) How are computer access capabilities and services identified?

Standard II. Promotion of additional user sites is an on-going function.

- 1) Are promotional materials available?
- 2) Are contacts systematically made?
- 3) Are referrals followed up in a reasonable period of time?
- 4) Are demonstrations conducted as needed?
- 5) Is special assistance provided with terminal hook up?
- 6) Are follow-up demonstrations and explanations provided?
- 7) Is demonstration time provided?
- 8) Has research been done to identify different types of potential users?
- 9) Are records kept on referrals and demonstrations?

Standard III. Public information is available in concise, accurate and effective form.

- 1) Are materials for general distribution describing the system available? Attach examples.

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- 2) Are public information releases/newsletters, etc. circulated and in evidence?
 - 3) Are definite activities carried on in the public relations field?

Standard IV. User materials are well designed, easily used, appealing to users and readily available.

- 1) Are materials accurate?
- 2) Are materials easily used and understood by users?
- 3) Are materials readily available in appropriate quantity?
- 4) Is the reading level appropriate to the audience?
- 5) Are materials designed to promote interest and use?

Standard V. Training for use of the system is provided.

- 1) Is a training plan in evidence?
- 2) Are all new users promptly and properly trained?
- 3) Is inservice held annually for all users?
- 4) Are user problems promptly handled?
- 5) Are new items or changes in system/information appropriately communicated to users?
- 6) Does evidence exist that system use problems are corrected promptly?

Standard VI. A system of communication between marketing staff and users is in effect.

- 1) Is a newsletter or other communications device effectively employed?
- 2) Are provisions made for user feedback over and above annual evaluation?

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- 3) Are records kept of user feedback and problems?

Standard VII. The system should be available to all clients/students during their regular day.

- 1) Do all clients/students have access to the system during their regular attendance hours?

Standard VIII. The delivery system should be available as part of the counseling and instructional process and also made available for independent client use.

- 1) What evidence is there that the delivery system is integrated with counseling and instructional programs of the user agencies?
- 2) How is independent client use fostered?
- 3) Is all information available to all users in a reasonable period of time?

Standard IX. Costs for the delivery system should be at a level per user which will make it feasible for user agencies or local or state governments to financially support them.

- 1) Describe the cost schedule. What is the estimated per user cost?
- 2) How is the pricing schedule developed?
- 3) Are user agencies consulted in determining new fee schedules?

Standard X. A coordinator should be identified on each user site.

- 1) Is there a list of coordinator names and addresses?
- 2) Are tasks and responsibilities identified for the coordinators?
- 3) Is there a plan for coordination training?

DELIVERY SYSTEMS

The delivery of career information to users includes two broad functions, accessing and dissemination. Accessing is the strategy or approach used by the individual to search out and explore information. Dissemination is concerned with the provision or availability of the information for a wide variety of users. The following operating standards for accessing and dissemination should be met by a system.

Standard I. The system should employ at least two medias of delivery.

- 1) What are the delivery system media?

Standard II. The delivery system should be demonstrably effective with persons of varying ability and experience.

- 1) What is the range of ability levels and background of current users?
- 2) Have there been reports of ineffectiveness with any of the user groups? If so, what action was taken?

Standard III. The delivery system should present information in an attractive and interesting manner so as to motivate users to continue use of the system and to further explore occupational areas.

- 1) What evidence is there of the presence of this motivational factor in the delivery system?

Standard IV. The delivery system components should be user-operable so that independent usage may be fostered.

- 1) What feedback has been provided by user agencies concerning ease of usage by the individual user?

Standard V. The system should provide user agencies with booklets or sets of instructions on how to use the various components for distribution to users. Such instructions should include directions for operating the various hardware components and descriptions of the information files available in the system. The instructions should be written at a reading level appropriate to a wide variety of intended users.

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- 1) Are booklets or operating instructions readily available to system users?
 - 2) Describe the number and types of booklets or operating instructions distributed by the system.
 - 3) Have feedback reports from user agencies indicated any problems with the user materials? If so, what action was taken?

Standard VI. Materials to which users are referred by the system should be available in an easily accessed information center.

- 1) What method is used by the system staff to determine if this standard is being observed at the user site?
- 2) If this standard is not being observed, what action is taken by the system? If such action has been taken, what were the results?

Standard VII. The statements made in one medium should be consistent and compatible with those made in other files or media and a system should be present that refers users from one delivery vehicle to another.

- 1) What is the process and staff responsibility for insuring that consistent information is given in all the files and in all of the delivery media?
- 2) What method is used for referring users from one delivery vehicle to another?

Standard VIII. Any delivery system hardware components required should be standard equipment that is reliable, widely available, and applicable to a variety of users. Computers in use should be subject to minimum "down-time" and software should be "bug-free" so as to not inconvenience users.

- 1) What problems have users reported concerning hardware reliability? How have such problems been handled?
- 2) Describe the process used by the system in choosing or recommending hardware components to user agencies?

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- 3) How often is computer software checked for reliability or updated?
 - 4) Is there a system staff member responsible for delivery systems hardware and software supervision?
 - 5) Is there a back-up system available in case the primary computer is not in operation?

Standard IX. The delivery system must be able to provide a copy of a summary of its basic information to the user for future reference.

- 1) Is such a printed copy of information available to users no matter what type of delivery system or hardware component is being used? If not, why not?
- 2) Are users allowed to obtain any amount of material from the system? If not, please explain.

Standard X. The delivery system should be able to house all information related to the topics listed for information development, including localized information.

- 1) What space problems exist at the present time, if any?

Standard XI. The system must have an updating capability so that new information can be entered into the system and made available to users within at least six months of the time it becomes available. Some exceptions exist; primarily, data items that are published and are accurate on a yearly basis.

- 1) Describe the update and distribution process.
- 2) Which files are updated on an annual cycle?

Standard XII. A user should be able to obtain the information desired which is available through that medium of delivery before leaving the system or within a reasonable period of time.

- 1) What help is provided to users who are having difficulty in locating information that exists within the system?

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- 2) Have users reported an excessive time lag in receiving information?

Standard XIII. The accessing strategies or approaches used to obtain information should be available both in a direct access and a structured search mode depending on the preferences of the user.

- 1) Are both types of accessing strategies available to system users? If not, why not?

Standard XIV. If an accessing strategy provides for the use of a client's records (e.g., test scores, class rank, interest inventories, etc.) the client should be aware of all test scores and personal records which are input into the system. Furthermore, the use of client records must not prohibit a client from continuing exploration in any chosen occupational area. Client records, records of individual system use, or any other personal data obtained or used by the system for whatever purpose must be adequately safeguarded so that their security and confidentiality will be maintained.

- 1) Does the delivery system require or allow the use of the client's personal records?
- 2) Are personal records used to limit system use in any way?
- 3) What safeguards exist to protect confidentiality of records, if personal records are used?
- 4) If personal records are used, how are clients made aware of this fact?

Standard XV. The delivery system should be accessible to adequately serve the user site.

- 1) Is the information delivered by the system available at times and places convenient for the user? Is printed material easily accessible to users?
- 2) Does the system have standards describing the amount of equipment and materials per site?

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- 3) Have system staff visits to user agencies shown that this standard is being observed?

Standard XVI. Costs for the delivery system components should be at a level per user which will make it feasible for user agencies or local or state governments to financially support them.

- 1) Describe the system component cost including estimated per user costs.

Standard XVII. The system should have a staff member responsible for supervising and available for consultation by user agencies concerning the delivery system.

- 1) If there is a staff member assigned to supervision of the delivery system, what is the title and percentage of time allocated to such duties?

EVALUATION

Standard I. An annual evaluation is in evidence.

- 1) Is a plan for evaluation in evidence?
- 2) Are both users and staff involved?
- 3) Are third-party persons involved in the evaluation?

Standard II. A plan for utilizing evaluation results is in evidence.

- 1) What use is made of evaluative data?
- 2) What benefits have been derived as a result of utilization of evaluation information?

Standard III. A system research and development effort is in place, with adequate resources allocated, to ensure that the delivery system keeps up with the technological improvements in the field.

- 1) Is such an effort currently being made?

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- 2) How does the system make adequate research and development resources available for design, pilot-testing and evaluation as well as implementation of improvements?

SYSTEM FINANCE

Standard I. Financial planning is being conducted.

- 1) What are the sources of operating funds?
- 2) Who is the system fiscal agent?
- 3) What is the process for developing the budget?
- 4) Is an audit conducted? If completed, what were the results?
- 5) How is management informed concerning financial status of the system?

Standard II. The budget is adequate to provide the services expected by the users.

- 1) What evidence exists that funds available are adequate to operate the system? If funds are not currently adequate, what plans are underway to rectify the situation?
- 2) Who are the largest financial supporters of the system? What percent of the budget does each provide? Which supporter groups are users? How reliable is each of these sources of funding?

APPENDIX B

SYSTEM PUBLICATIONS

	GENERAL INFORMATION (i.e., purpose system, description, costs, etc.)	RESEARCH AND EVALUATION (i.e., studies, field tests, etc.)	COMPUTER HARDWARE AND SOFTWARE (i.e., hardware characteristics, software availability, costs, etc.)
CIS	Sample printouts from the Career Info. System.	List of Publications.	Computer Require- ments; Software pricing sheet.
CHOICES	CHOICES leaflet and CHOICES Booklet; Travel Guide.	Field Trial Evaluation Report	CHOICES Computer- ization Technical Review (Complete information on technical specifi- cations, diagrams, etc.).
COIN	COIN brochure Major Features of The COIN Computer System	Not reported	COIN Interaction System Specifica- tions Sheet (tech. info. on hardware and software.).
CVIS	CVIS Catalog (lists capabilities, products, etc.).	CVIS Evaluation Manual (ways to evaluate CVIS.).	CVIS Catalog (Lists all CVIS versions and applications.).
DISCOVER	DISCOVER Profes- sional Manual; DISCOVER's Update (quarterly News- letter); Student Slide-tape Presen- tation; Professional Guidance Slide Set; DISCOVER posters.	Not Reported	Write IBM or DISCOVER Foundation

Appendix B

GIS	"The Guidance Information System" (description of GIS); Career Education Catalog (description of GIS and related career education materials.).	A packet will be prepared for each request	Time Share's Computer Capabilities
SIGI	Answers to Frequently Asked Questions about SIGI - 1977; SIGI at a Glance - 1975.	Field Test and Evaluation of Sigi - 1977.	SIGI Hardware Guide - 1979; Software Support Manual.

Appendix B

	SYSTEM IMPLEMENTATION (i.e., pre and post system activities, staff development, etc.)	SOURCES:
CIS	User's Handbook: CIS Implementation Handbook.	Dr. Bruce McKinlay Oregon CIS 247 Hendricks Hall Univ. of Oregon Eugene, OR 97403
CHOICES	Counsellor's Manual; Handbook of CHOICES; Travel Guide.	Phillip S. Jarvis Canada Emp. and Immigration Comm. 5th Floor, Phase IV Place Du Portage Hull, Quebec Canada
COIN	COIN Index	Dr. Rodney Durgan COIN, Inc. 1230 W. Wooster Bowling Green, OH 43402
CVIS	CVIS Counselor Training Handbook; CVIS Counselors Handbook; CVIS Student Handbook (J.H. & S.H. Versions).	Carol M. Rabush CVIS Distribution Cir. Western Maryland College Westminster, MD 21157
DISCOVER	Professional Manual; User Resource Guide; DISCOVER Inservice Training Manual-1976 (outline, materials and visual aids for training staff).	Dr. JoAnn Harris- Bowlsbey DISCOVER Foundation, Inc. Towson State Univ. Towson, MD 21204
GIS	GIS User Guide; Setting up a Career Resource Center; GIS Training Guide; Implementation Kit.	Linda Kobylarz Time Share 630 Oakwood Avenue West Hartford, CT 06110
SIGI	Manager's Guide; Counselor's Handbook for SIGI; Installation Manual	Dr. Martin Katz Educational Testing Service Princeton, NJ 08541

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